

WHAT IS CLAIMED IS:

1. An optical transmission system comprising:

an end station including a monitor instruction
5 sending unit for sending a monitor instruction for
monitoring an operating condition, and an operating
condition recognizing unit for receiving a response signal
and recognizing the operating condition; and

a repeater including:

10 a filtering unit filtering the monitor instruction
and the response signal;

a monitor control unit monitoring an operating
condition of the repeater in response to the monitor
instruction and generating response information that is a
15 result of monitoring;

a pump unit applying a pump light to an optical
fiber transmission medium and enabling an optical
amplification using the optical fiber transmission medium
as an amplifying medium;

20 a regeneration control unit performing a
regeneration control of the response signal sent by
another repeater to thereby generate a regenerated signal;

a modulation control unit modulating the pump
light by the response information or the regenerated
25 signal to thereby generate the response signal; and

a photocoupler unit that is connected to the
optical fiber transmission medium and sends the response

signal in a direction identical to or reverse to that in which an optical main signal travels.

2. The optical transmission system according to claim 1, wherein the pump unit performs backward Raman amplification.

3. The optical transmission system according to claim 1, wherein, when the response signal travels in the direction reverse to that in which the optical main signal travels, the modulation control unit superimposes the result of monitoring onto the pump light that is obtained from the photocoupler unit and travels in the direction reverse to a pumping direction.

4. The optical transmission system according to claim 1, wherein the regeneration control unit ceases the regeneration control when the modulation control of the pump light is based on the response information.

5. A repeater for an optical transmission comprising:

a filtering unit filtering a monitor instruction for monitoring an operating condition and a response signal;

a monitor control unit monitoring an operating condition of the repeater in response to the monitor

instruction and generating response information that is a result of monitoring;

5 a pump unit applying a pump light to an optical fiber transmission medium and enabling an optical amplification using the optical fiber transmission medium as an amplifying medium;

a regeneration control unit performing a regeneration control of the response signal sent by another repeater to thereby generate a regenerated signal;

10 a modulation control unit modulating the pump light by the response information or the regenerated signal to thereby generate the response signal; and

15 a photocoupler unit that is connected to the optical fiber transmission medium and sends the response signal in a direction identical to or reverse to that in which an optical main signal travels.

6. The repeater according to claim 5, wherein the pump unit performs backward Raman amplification.

20 7. The repeater according to claim 5, wherein, when the response signal travels in the direction reverse to that in which the optical main signal travels, the modulation control unit superimposes the result of
25 monitoring onto the pump light that is obtained from the photocoupler unit and travels in the direction reverse to a pumping direction.

8. The repeater according to claim 5, wherein the regeneration control unit ceases the regeneration control when the modulation control of the pump light is based on the response information.

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